CL1253 US DIV

TITLE

POLYMERIC PHOSPHITE COMPOSITION AND HYDROCYANATION OF UNSATURATED ORGANIC COMPOUNDS AND THE ISOMERIZATION OF UNSATURATED NITRILES

FIELD OF THE INVENTION

This application is a DIV of 09/399,261 filed 09/20/1999, now U.S. Patent 6,284,865

This invention relates to a polymeric phosphite composition and polymeric phosphite catalyst composition that can be useful for a variety of catalytic processes, to a process for producing the composition, and to a process for using the composition in the hydrocyanation of unsaturated organic compounds and the isomerization of unsaturated nitriles.

BACKGROUND OF THE INVENTION

Phosphorus-based ligands are ubiquitous in catalysis, finding use for a number of commerically important chemical transformations. Phosphorus-based ligands commonly encountered in catalysis include phosphines and phosphites. Monophosphine and monophosphite ligands are compounds which contain a single phosphorus atom which serves as a donor to a transition metal. Bisphosphine, bisphosphite, and bis(phosphorus) ligands in general, contain two phosphorus donor atoms and typically form cyclic chelate structures with transition metals.

Two industrially important catalytic reactions using phosphorus ligands of particular importance are olefin hydrocyanation and isomerization of branched nitriles to linear nitriles. Phosphite ligands are particularly good ligands for both reactions. The hydrocyanation of ethylenically unsaturated compounds using transition metal complexes with monodentate phosphite ligands is well documented in the prior art. See for example US 3,496,215; 3,631,191; 3655,723; 3,766,237; and 5,543,536. Bidentate phosphite ligands have also been shown to be particularly useful ligands in the hydrocyanation of activated ethylenically unsaturated compounds. See for example, Baker, M.J., and Pringle, P.G., *J. Chem. Soc., Chem. Commun.*, 1292, 1991; Baker et al., *J.Chem. Soc., Chem. Commun.*, 803, 1991; WO 93,03839; US 5,512,696; 5,723,641; 5,688,986.

Recovery of the ligand and catalyst is important for a successful process. Typical separation procedures to remove the product(s) from the catalyst and ligand involve extraction with an immiscible solvent or distillation. It is usually difficult to recover the catalyst and ligand quantitatively. For instance, distillation of a volatile product from a non-volatile catalyst results in thermal degradation of the catalyst. Similarly, extraction results in some loss of catalyst into the product phase. For extraction, one would like to be able to tune the solubility of the ligand